Operating Instructions
Electronic Preset Counter
Type Series 903

1. Description

– 6 digit preset counter, 1 preset, add./subtr.

– bright 2-line LCD display with symbols for activated output and current preset value

– count and preset range – 999999 to 999999, over- or underflow without count loss up to 1 decade (will be indicated by flashing of the display with 1 Hz frequency)

– programmable to operate as a preset counter, timer or frequency meter

– relay or optocoupler output

– programming of count functions/operating parameters via the setting keys. During programming the display guides the user with text prompts.

– programmable features:
operating mode (output signal at zero or at preset point, with or without automatic reset)
decimal point
polarity of the inputs (NPN or PNP)
input mode and scaling factor
output signals to be permanent or timed
gate time when programmed as a frequency meter
resolution when programmed as a timer (s, min, h or h:min:s)

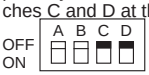
– supply voltage 230 VAC, 115 VAC, 48 VAC, 24 VAC or 11...30 VDC

– backlit display (optional)

2. Inputs

2.1 INP A, INP B

Count inputs; max. count frequency 30 Hz or 10 kHz separately selectable for both inputs via programming switches C and D at the right side of the housing.



Microswitch	INP A 30 Hz	INP A 10 kHz	INP B 30 Hz	INP B 10 kHz
D	ON	OFF		
C			ON	OFF

2.2 Gate

Static input; no counting while this input is activated. If operated as a timer (only h, min and 0.1 min resolutions), the decimal point between the 5th and 6th decade flashes while gate input is not activated (operating indication).

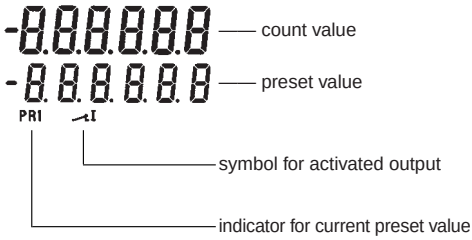
2.3 Reset

Dynamic input; switched in parallel with the red set key and sets the counter to zero (adding mode) or to the preset value (subtracting mode).

2.4 Key

Static keyboard lock input. While this input is activated, it is neither possible to reset the counter nor to change the preset value.

3. Display



4. Output

Relay with potentialfree change-over contact or optocoupler with open collector and emitter.
Activated output will be indicated by ⌐I.
For safety circuits the operation of the relay, resp. the optocoupler may be inversed. Thus the relay coil will be dead, resp. the optocoupler will be locked when reaching the preset point. For that the output signal
Out 1 must be set to ⌐ (permanent signal) or ⌐⌐ (timed signal) during the programming routine.

Caution: For operating modes with automatic reset (AddAr, SubAr) the duration of the timed signal for the output has to be programmed, otherwise the output signal has no defined duration (see programming).

5. Setting of the operating parameters

a. connect to supply voltage

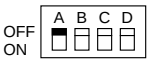
b. set microswitch „A“ (right side of the housing) to “ON” for a short time. Display will show 1st menu item “Mode”.

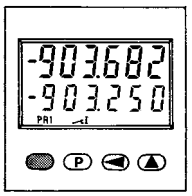
c. select required function via ↑key

d. press P-key to store selected function/enter data and to change over to next menu item.

e. select again the required function via ↑key resp. enter data (prescaling factor, duration of timed signal, gate time, resolution) directly via the two arrow-keys.

f. After programming the last menu item (permanent or timed signal), the programming routine will be left by pressing the P-key, if microswitch „A“ ist set to “OFF”. If it is still set to “ON”, the programming routine will be passed through once again.

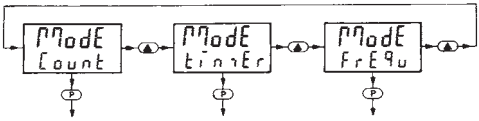




6. Setting of the operating mode

6.1 Selection of basic function

After microswitch “A” has been switched to “ON” for a short time, one of the basic functions will be displayed as follows:

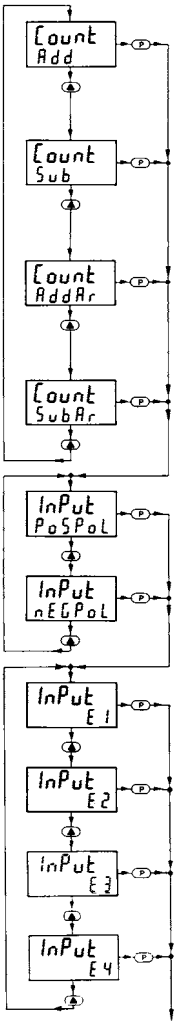


programming routine Impulse Counter

programming routine Timer

programming routine Frequency Meter

6.2.1 Programming routine Impulse Counter



Operating mode Add:
Adding mode
Permanent signal at count value M preset value or timed signal at count value = preset value
Reset to zero

Operating mode Sub:
Subtracting mode
Permanent signal at count value m zero or timed signal at count value m zero. Reset to preset value

Operating mode AddAr:
Adding mode
Timed signal at count value = preset value
Automatic reset to zero

Operating mode SubAr:
Subtracting mode
Timed signal at count value = zero
Automatic reset to preset value

Polarity of the inputs:
pospol: positive polarity (PNP) switching to + 24 V

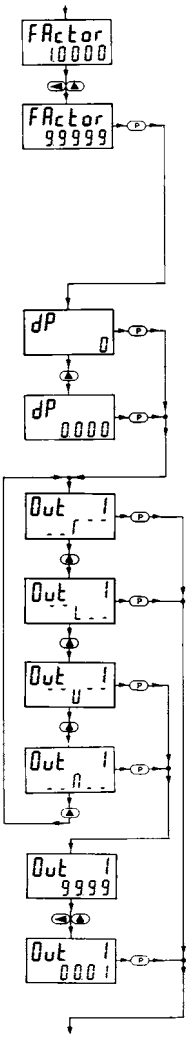
negpol: negative polarity (NPN) switching to 0 V

Input modes:
E1: INP A = count input
INP B = count direction input

E2: INP A = count input adding
INP B = count input subtr.

E3: Quadrature input
INP A = count input 0°
INP B = count input 90°

E4: same as E3, but with pulse doubling.
Each pulse edge of INP A will be counted.



Scaling factor:
0.0001…9.9999
Setting with ¤and /-keys

Factor 0.0000 won’t be accepted
Caution! In operating modes Sub and SubAr (output signal at count value = zero) the preset value has to be integerly divisible by the factor, otherwise the counter - when resetted- will be set to the following integer multiple of the factor.

Decimal point
(only optical function)
0 = no decimal point
0.0 = one decimal place
0.00 = two decimal places
0.000 = three decimal places

Permanent signal of the output, activated at count value M preset value in adding mode and at count value m zero in subtracting mode*

Permanent signal of the output, will become passive at count value M preset value in adding mode and at count value m zero in subtracting mode**

Timed signal of the output, will become passive at count value = preset value in adding mode and at count value = zero in subtracting mode**

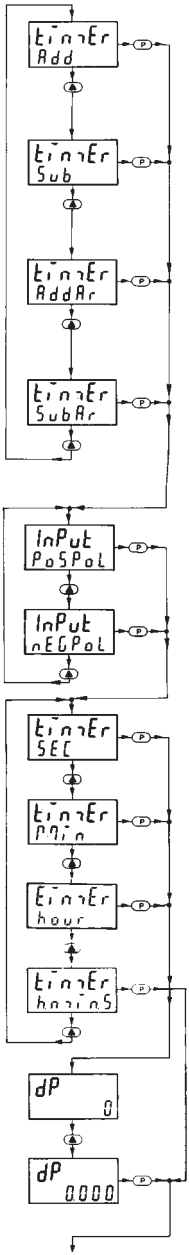
Timed signal of the output, activated at count value = preset value in adding mode and at count value = zero in subtracting mode*

Duration of timed signal of the output, can be set from 00.01 s to 99.99 s

* Activation of relay coil resp. optocoupler when reaching the preset value

** Relay coil becomes dead resp. optocoupler will be locked when reaching the preset value.

6.2.2 Programming routine Timer



Operating mode Add:
Adding mode
Permanent signal at count value M preset value or timed signal at count value = preset value
Reset to zero

Operating mode Sub:
Subtracting mode
Permanent signal at count value m zero or timed signal at count value = zero. Reset to preset value

Operating mode AddAr:
Adding mode
Timed signal at count value = preset value. Automatic reset to zero

Operating mode SubAr:
Subtracting mode
Timed signal at count value = zero
Automatic reset to preset value

Polarity of the inputs:
pospol: positive polarity (PNP), switching to + 24 V

negpol: negative polarity (NPN), switching to 0 V

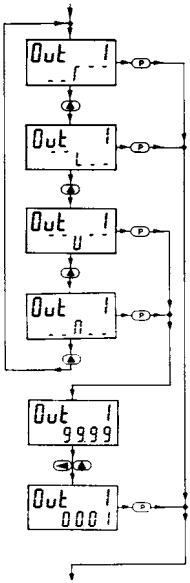
Unit of time:
Timing in s; 0.1 s; 0.01 s or 0.001 s*

Timing in min; 0.1 min; 0.01 min* or 0.001 min*

Timing in h; 0.1 h; 0.01 h or 0.001 h*
* depending on position of the decimal point

Timing in h: min: s

Decimal point (resolution):
0 = no decimal point
0.0 = one decimal place
0.00 = two decimal places
0.000 = three decimal places



Permanent signal of the output, activated at count value M preset value in adding mode and at count value m zero in subtracting mode *

Permanent signal of the output will become passive at count value M preset value in adding mode and at count value m zero in subtracting mode**

Timed signal of the output, will become passive at count value = preset value in adding mode and at cont value = zero in subtracting mode**

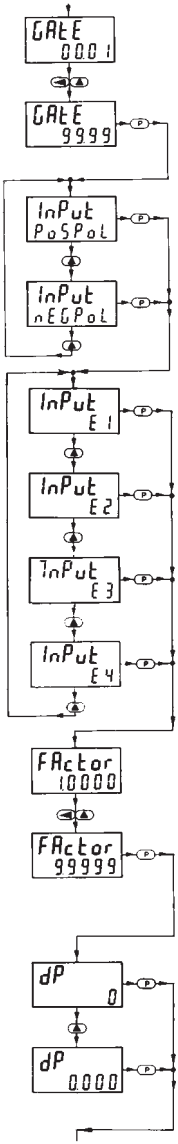
Timed signal of the output, activated at count value = preset value in adding mode and at count value = zero in subtracting mode*

Duration of timed signal of the output, can be set from 00.01s to 99.99 s.

* Activation of relay coil resp. optocoupler when reaching the preset value

** Relay coil becomes dead resp. optocoupler will be locked when reaching the preset value.

6.2.3 Programming routine Frequency Meter



Gate time = within this period the incoming pulses will be counted and displayed.
Programmable range from 00.01 s to 99.99 s
Setting with ¤and /-keys
00.00 won't be accepted

Polarity of the inputs:
pospol: positive polarity (PNP), switching ot +24 V

negpol: negative polarity (NPN), switching to 0 V

Input modes:
E1: INP A = count input
INP B = count direction input

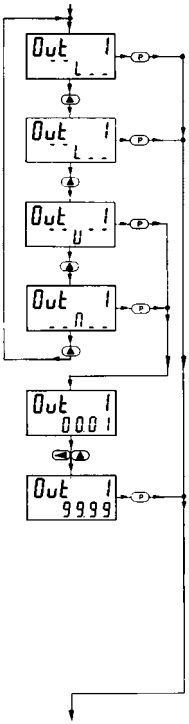
E2: INP A = count input adding
INP B = count input subtr.

E3: Quadrature input
INP A = count input 0°
INP B = count input 90°

E4: same as E3, but with pulse doubling.
Each pulse edge of INP A will be counted.

Scaling factor:
0.0001...9.9999
Setting with ¤and /-keys
Factor 0.0000 won't be accepted

Decimal point
(only optical function):
0 = no decimal point
0.0 = one decimal place
0.00 = two decimal places
0.000 = three decimal places



Permanent signal of the output, activated at count value M preset value*

Permanent signal of the output, will become passive at count value M preset value**

Timed signal of the output, will become passive at count value = preset value**

Timed signal of the output, activated at count value = preset value*

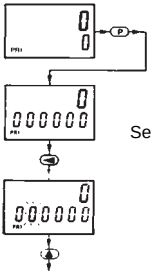
Duration of timed signal of the output, can be set from 00.01 s to 99.99 s

* Activation of relay coil resp. optocoupler when reaching the preset value

** Relay coil becomes dead resp. optocoupler will be locked when reaching the preset value.

7. Programming of the Preset Value:

After pressing one of the arrow keys, the leading zero blanking will be suppressed for approx. 4 seconds and the least significant digit of the preset value flashes with a frequency of 1 Hz.
The value of the flashing digit can be increased by using the /-key. With the ¤ key it will be changed to the next digit. If no key is pressed for 4 seconds, the leading zero blanking will be activated automatically again.
In operating mode Impulse Counter and Frequency Meter the new value will be taken over now.

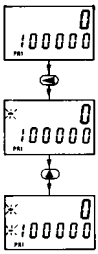


Setting of the 6th decade

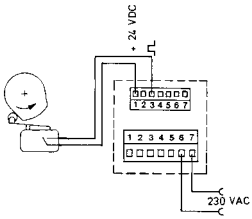
7.1 Setting of the sign

Select the sign by using the ¤ key. The sign will start to flash now and can be assigned to the preset value resp. eliminated by using the /-key.
If no key is pressed for 4 seconds, the leading zero blanking will be activated automatically again. Preset value and count value are displayed now with the corresponding sign.

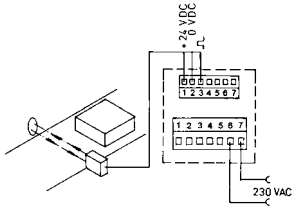
Caution! In case of automatic reset no negative values are to be set for the preset value.



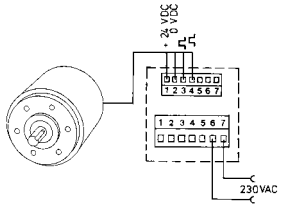
8. Examples for application connections:



Count pulses from contact closure (programmed polarity PNP)

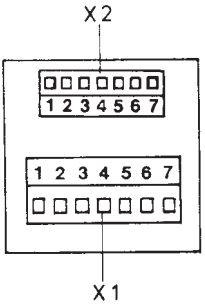


Count pulses from a light barrier



Count pulses from a shaft encoder

9. Connections



9.1 Plug connection X1

Terminal No.	AC version	DC version
1	without connection	
2	without connection	
3	relay output common contact (C) optocoupler output emitter	
4	relay output normally open contact (NO)	
5	relay output normally closed contact (NC) optocoupler output collector	
6	90…260 VAC/ 48 VAC/24 VAC	11…30 VDC operating voltage
7	90…260 VAC 48 VAC/24 VAC	0 VDC (GND)

Caution! For settings ⅂L and ⅂LГ (inverted operation of relay or optocoupler) the connections of terminal 4 and 5 change as follows:

Terminal No.	AC- and DC versions
4	relay output normally closed contact (NC)
5	relay output normally open contact (NO)

9.2 Plug connection X2

Terminal No.	Designation	Function 230 VAC/115 VAC 48 VAC/24 VAC version	Function 11…30 VDC version
1	+ 24 VDC	Transmitter voltage	—
2	GND	0 VDC reference voltage	—
3	INP A	count input A	
4	INP B	count input B	
5	RESET	reset input	
6	GATE	gate input	
7	KEY	keyboard lock input	

10. Technical Data

Supply voltage:
90…260 VAC, 48 VAC, 24 VAC,
50/60 Hz, ±10 %,
max. 4 VA
or 11…30 VDC, max. 0.1 A

Display: 6 digit, 2-line 7 segment LCD display
with sign
count value 9 mm high characters
preset value 7 mm high characters
symbols for displayed preset and closed output contact

Polarity of input signals:
programmable, all inputs in common

Input sensitivity:
approx. 10 kOhm

Count frequency:
via DIL switches separately selectable for INP A and INP B
30 Hz
10 kHz (7 kHz for input modes E3 and E4, quadrature inputs)
in case of automatic reset 900 Hz
without count losses (500 Hz for input mode E4)

Min. pulse length of the control inputs:
5 ms

Input sensitivity:
For AC supply voltages
Log “0”: 0… 4 VDC
Log “1”: 12…30 VDC
For DC supply voltage U_b
Log “0”: 0…0.2 x U_b
Log “1”: 0.6 x U_b…30 VDC

Pulse shape: variable (Schmitt Trigger characteristic)

Output: Relay with potentialfree make or break contact
switching voltage max.
250 VAC / 300 VDC
switching current max. 3 A
switching current for DC min. 30 mA
switching performance max. 50 W for DC and max. 2000 VA for AC
or
optocoupler with open collector and emitter
switching performance: 30 VDC/15 mA
U_{cesat} at I_c = 15 mA: max. 2.0 V
U_{cesat} at I_c = 5 mA: max. 0.4 V

Responding time of outputs:
Relais: approx. 6 ms
Optocoupler: approx. 1 ms

Data retention:
min. 10 years or 10^6 memory cycles

Transmitter voltage:
24 VDC –40 % / +15 %, 80 mA
unstabilized for 24 and 48 VAC-versions

24 VDC –40 % / +15 %, 100 mA
unstabilized for 90…260 VAC-versions

Fuse protection:
recommended fuse
for DC: 0.125 AT
for 90…260 VAC: 0.05 AT
for 48 VAC: 0.2 AT
for 24 VAC: 0.4 AT

Noise immunity:
EN 55011 class B and EN 50082-2
with shielded data inputs

Ambient temperature:
0…50°C

Storage temperature:
–25°C…+70°C

Weight: approx. 240 g (AC-version with relay)

Protection: IP 65 (front)

Colour of housing:
black

Cleaning: The front of the unit is only to be cleaned with a soft and wet (water!) cloth.

11. Delivery includes

– Counter 903
– Screw terminal plug 7 poles, reference grid 5.08 mm
– Screw terminal plug 7 poles, reference grid 3.81 mm
– Bezel for screw mount, panel cut-out 50 x 50 mm
– Bezel for clip mount, panel cut-out 50 x 50 mm
– Panel mounting clip

12. Ordering Code

6.903.010.000

Option:
00 = without
10 = backlit LCD

Supply voltage:
0 = 90…260 VAC
3 = 11…30 VDC

Output:
0 = Relais
1 = Optocoupler